INTEGRATED PROCESS FOR THE PREPARATION OF PHENOL FROM BENZENE WITH RECYCLING OF THE BY-PRODUCTS

Abstract

The invention relates to a process for the preparation of phenol comprising the following phases:

1) preparation in continuous of phenol by means of the direct oxidation of benzene with hydrogen peroxide operating with an $H_2O_2$/benzene ratio ranging from 10 to 70%, in a three-phase reaction system comprising a first liquid phase consisting of benzene and an organic solvent, a second liquid phase consisting of water, a solid phase consisting of an activated catalyst based on titanium silicalite TS-1;

2) separation of the phenol and non-reacted benzene from the reaction mixture of the oxidation section (1), by means of fractionated distillation;

3) separation of the solvent and by-products from the mixture coming from the distillation tail (2), by means of basic extraction;

4) transformation of the by-products obtain in section (3) to phenol by means of hydrodeoxygenation with hydrogen operating in continuous, in aqueous solution, at a temperature ranging from 250 to 500°C, at pressures of 1-100 bar and in the presence of a catalyst based on elements of group VIB or their mixtures or group VIII of the periodic table or their mixtures;

5) recycling of the phenol obtained in section (4) to the distillation section (2).